Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	
Expanding Flexible Use of the 3.7 to 4.2 GHz Band	GN Docket No. 18-122
Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rules to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band	RM-11791
Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service	RM-11778

COMMENTS OF GOOGLE LLC ON INTERFERENCE PROTECTION RIGHTS

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I. INTRODUCTION AND SUMMARY

Google LLC ("Google") supports the Commission's effort to open the 3.7-4.2 GHz band to more intensive terrestrial use through fixed point-to-multipoint ("P2MP") services and mobile broadband.[1] This project will open up much-needed mid-band spectrum for the 5G transition and support technologies that connect Americans in rural and underserved areas. We respond to the Commission's Public Notice ("PN") on

[1] *Expanding Flexible Use of the 3.7 to 4.2 GHz Band, Order and Notice of Proposed Rulemaking*, 33 FCC Rcd. 6915, ¶¶ 16-25, 39 (2018) ("Order & NPRM").

enforceable interference rights to demonstrate that the Commission can accomplish these goals consistent with the rights of existing operators in the band.[2]

As explained below, the interests of earth station operators in interference protection arise from the satellite operators' rights to transmit their signals successfully to lawfully registered earth stations. Rather than vindicating any rights held directly by earth station operators, coordination between C-Band earth stations and co-primary fixed service licensees effectuates the space station operators' license rights in the band. Accordingly, in the coordination process, earth station operations should be protected to the extent necessary to protect delivery of Commission-authorized satellite signals.

Earth stations are not entitled to greater protection than this, however. In particular, full-band, full-arc registration of earth stations and coordination to protect all frequencies and orbital slots regardless of their actual use are not necessary to effectuate space station operators' rights. As the Commission has recognized, "[a] reexamination of the full-band, full-arc coordination policy is appropriate in light of [the agency's] goal to maximize spectrum efficiency and use in the 3.7-4.2 GHz band including more intensive terrestrial use of the band."[3] Google agrees, and urges the Commission to adopt a framework that allows more intensive terrestrial use by authorizing fixed P2MP services on a shared basis while fully protecting earth stations

[2] *See International Bureau and Wireless Telecommunications Bureau Seek Focused Additional Comment in 3.7-4.2 GHz Band Proceeding*, DA No. 19-385 (rel. May 3, 2019) ("Additional Comment PN").

[3] Order & NPRM, ¶ 39.

from harmful interference and by discontinuing the inefficient full-band, full-arc coordination practice.

The Commission can reorganize the 3.7-4.2 GHz band in this way consistent with the enforceable interference rights of incumbents. Most promisingly, consistent with the rights and interests of satellite and earth station operators, the Commission can adopt an auction mechanism to assign any new exclusive-use terrestrial licenses, rather than allowing a group of incumbent licensees to determine the landscape of these important mid-band frequencies through a private placement designed to serve their private interests.[4] The Communications Act gives the Commission sufficient authority to modify existing licenses and conduct C-Band auctions.[5] The interconnected nature of incumbent interests in the band further counsels in favor of the Commission maintaining control over the reallocation and licensing process, rather than allowing a small group of incumbents to determine the outcome for the entire band.

[4] *See, e.g.*, Comments of T-Mobile USA, Inc. at 5-7, GN Docket No. 18-122 (filed Oct. 29, 2018); Comments of Dynamic Spectrum Alliance at 17, GN Docket No. 18-122 (filed Oct. 29, 2018); Comments of the Public Interest Spectrum Coalition at 22, GN Docket No. 18-122 (filed Oct. 29, 2018).

[5] *See* 47 U.S.C. §§ 309(j); 316; *see also, e.g.*, Letter from Elizabeth Andrion, Senior Vice President, Regulatory Affairs, to Marlene Dortch, Secretary, FCC, Docket No. 18-122 (filed Feb. 22, 2019) (discussing the Commission's Section 309(j) authority to hold auctions); Letter from Michael Calabrese, Director, Wireless Future Project, New America, to Marlene Dortch, Secretary, FCC, Docket No. 18-122 (filed May 22, 2019) (discussing Section 309(j)); Letter from Russell H. Fox, Counsel, T-Mobile USA, Inc., to Marlene Dortch, Secretary, FCC, Docket No. 18-122 (filed Apr. 11, 2019) (discussing the Commission's Section 316 authority to modify licenses).

II. THE ENFORCEABLE RIGHTS OF EARTH STATION OPERATORS DERIVE FROM THE RIGHTS OF SPACE STATION OPERATORS

The Commission and commenters have recognized the unique nature of fixed satellite service ("FSS") rights and interests in the C-Band.[6] This band is unusual both because of the nonexclusive satellite operator access to the band[7] and because of the bifurcation of satellite communications into (1) transmission by space stations and (2) reception by earth stations that are not necessarily licensed and registered contemporaneously and are often controlled by different entities. The Commission's PN hints at the significant legal implications of these characteristics: "So long as a satellite operator's transmission rights are not disturbed, would section 316 even apply if the Commission authorized additional terrestrial use that could interfere with the receipt of the signal?"[8]

In short, the rights of a space station operator are to transmit and successfully connect to FCC-authorized earth stations. This does not imply unconditional protection of earth stations, nor does it, as a general matter, include full-band, full-arc registration of earth stations. The legal status of earth station operators is dependent on the rights of space station operators to successfully connect, and the coordination requirement between earth stations and fixed service operators effectuates those space station operators' rights.

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[6] *See* Order & NPRM, ¶ 10 (referencing the "unique characteristics" of the 3.7-4.2 GHz band). *See also* Comments of R Street Institute at 5-6, GN Docket No. 18-122 (filed Oct. 29, 2018); Letter from Russell H. Fox, Counsel, T-Mobile USA, Inc., to Marlene Dortch, Secretary, FCC, at 5-6, GN Docket No. 18-122 (filed Mar. 19, 2019) (discussing the status of earth station operators).

[7] *See* Order & NPRM, ¶ 59.

[8] *See, e.g.*, Additional Comment PN at 4.

A. Space station operators have a right to transmit and successfully connect to earth stations authorized under the Commission's rules

The Commission asks about the "extent to which satellite space station operators have enforceable rights against harmful interference from terrestrial operations in the C-band under their space station licenses and market access grants [for foreign licensees]," specifically, whether "space station operators have a right to transmit free from harmful interference only where there are registered earth stations receiving their signal[.]"[9] The Commission's rules reflect that the enforceable rights of an individual space station operator are (1) the right to transmit and (2) the right to successfully connect to the individual earth stations that the FCC authorizes under applicable FCC rules.[10] Part 25.102(a), the rule requiring authorization for satellite space and earth stations, addresses these rights. The rule provides that "[n]o person shall use or operate apparatus for the *transmission of* energy or communications or signals by space or earth stations," except under appropriate Commission authorization.[11] Part 25.102(b) addresses the successful reception of signals and explains that earth station authorization under Part 25 provides "[p]rotection from impermissible levels of interference to the *reception of signals* by earth stations in the Fixed–Satellite Service from terrestrial stations in a co-equally shared band."[12]

The rights of space station operators thus depend on the ability of particular earth station receivers to successfully "hear" the space station transmissions. Accordingly, the

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[9] *Id.* at 2, 3.

[10] *See* 47 C.F.R. § 25.102.

[11] *See id.* § 25.102(a) (emphasis added).

[12] *See id.* § 25.102(b) (emphasis added).

purpose of the coordination requirement between receive-only earth stations and terrestrial fixed services is to ensure that signals transmitted from C-Band space stations can successfully reach earth station receivers as intended.[13] The interference protection accomplished through coordination between earth station operators and fixed terrestrial services therefore inures to the benefit of space station operators and their customers.

B. The legal status of individual earth stations is dependent on space station operators' rights

Earth stations do not have interference protection rights independent of space station operators' rights to transmit without interference to authorized earth stations. Receive-only earth stations are not required to obtain a license (except for receiving signals from non-U.S. licensed or authorized space stations) because they do not transmit any signals.[14] Rather, they are the receiving apparatus for the space station transmissions, and their protection from harmful interference is necessary to facilitate a space station's delivery of signals under a license or grant of market access.[15] The

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[13] *See id.* §§ 25.131(b), (f), 25.203. When the Commission first proposed shared use of the 3.7-4.2 GHz band between satellite services and terrestrial services, it recognized that the details of the coordination requirements would determine the ability of satellites to connect to earth stations. *See Shared Use of Certain Frequency Bands by Fixed, Mobile, and Communication-Satellite Services*, Notice of Proposed Rulemaking, 29 Fed. Reg. 17840 (Dec. 15, 1964) ("It is important to determine the extent to which such changes [to the coordination distance contours] might affect the ability of earth stations to communicate via satellites."). When the Commission authorized shared use of the band and first adopted Rule 25.203, it recognized the need to balance the size of the coordination distances with the "need to maintain flexibility in the establishment of a communication-satellite *system*." *Amendment of Parts 21 and 25 of the Commission's Rules to Provide for the Shared Use of the Frequency Bands 3700-4200, 5925-6425, 7250-7750 and 7900-8400 Mc/s by the Fixed, Mobile and Communication-Satellite Services*, Report & Order, 42 FCC 1262, ¶ 26 (May 19, 1965) (emphasis added).

[14] *See* 47 C.F.R. § 25.131.

[15] *See id.* § 25.102.

Commission's rules allow receive-only earth stations to register to be eligible for such protection from such harmful interference from terrestrial fixed service ("FS") operations.[16] Further, as a practical matter, the occurrence of harmful interference is not possible unless satellite signals are present for an earth station to receive. Thus, earth stations need not be protected from harmful interference absent a space station transmission on a particular frequency to a particular location.

When the Commission changed the Part 25 rules in 1991 to establish a registration program instead of a licensing regime for receive-only earth stations, it clarified that the "registration program will afford the same protection from interference as would a license issued under our former procedure,"[17] and that the goal of earth station licensing, "the protection of the earth station site through coordination," could still be fully achieved using a simpler registration program.[18] Importantly, the Commission explained that the interest protected by licensing or registration of earth stations is *harmful interference protection*—that is, the ability to receive at a particular location the signals of space stations transmitting on certain frequencies, not open-ended rights to occupy a swath of spectrum regardless of actual use or reception of signals.

[16] *Id.* § 25.131(b).

[17] *Amendment of Part 25 of the Commission's Rules & Regulations*, First Report and Order, 6 FCC Rcd. 2806, ¶ 7 (1991).

[18] *Amendment of Part 25 of the Commission's Rules & Regulations*, Notice of Proposed Rulemaking, 2 FCC Rcd. 762, ¶ 48 (1987).

III. PERMITTING FIXED POINT-TO-MULTIPOINT OPERATIONS AND ELIMINATING THE FULL-BAND, FULL-ARC PRACTICE ARE CONSISTENT WITH INCUMBENT RIGHTS

The NPRM seeks comment on changes to the Part 101 rules to permit P2MP use of the C-Band and facilitate more intensive fixed use.[19] Google strongly supports allowing fixed P2MP operations in the band to facilitate the delivery of wireless broadband in areas where the spectrum would otherwise be unused. P2MP operations will not interfere with existing satellite operations or with partial band clearing for new flexible use licenses.[20] As part of this improvement, the Commission should also continue to gather accurate information about current FSS use in the band and update the International Bureau Filing System ("IBFS") accordingly to enable effective sharing with fixed services and successful repurposing for new flexible use licenses. The recent collection of information on earth station and satellite use of the band, in accordance with the requirements set forth in the Commission's Order & NPRM, represents significant progress towards complete and accurate information about actual FSS use of the band, which should be continued as long as C-band satellite services remain operational.[21]

An important part of supporting more efficient use of the band by P2MP service is adoption of the Commission's proposal to discontinue the practice of allowing over-broad full-band, full-arc registrations in the 3.7-4.2 GHz band, including for existing

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[19] *See* Order & NPRM, ¶¶ 116-132 (seeking comment on more intensive P2MP fixed use).

[20] Reply Comments of Google LLC at 4-9, GN Docket No. 18-122 (filed Dec. 11, 2018).

[21] *See Deadline for Submission of Information on Earth Station and Satellite Use of the 3.7-4.2 GHz Band*, Public Notice, DA No. 19-278, GN Docket No. 18-122 (rel. Apr. 11, 2019).

registrations. As explained above, making this change for current and future registrations would not remove or reduce any licensee's or registrant's protected rights. To implement this change, the Commission should adopt its proposal to allow earth stations to claim interference protection "only for those frequencies, azimuths, and elevation angles and other parameters reported as in regular use (i.e., at least daily) in response to future information collections, until the incumbent starts the coordination process for an application to modify its license or registration in IBFS for its earth station."[22]

Although the FCC historically has permitted the inefficient full-band, full-arc registration practice in the coordination rules, the objective of the Commission's rules—to protect the reception of signals by earth stations[23]—does not require or even suggest it. In reality, most earth stations are using only a fraction of the full 500 MHz of C-Band spectrum. It is clear on the face of some earth station registrations that the requested protections are excessive and not required to protect satellite communications. For example, the Associated Press maintains hundreds of full-band, full-arc registrations in IBFS, despite clear indications that they use only 23 MHz of spectrum on two different satellites.[24] Recently, as a result of the Commission's efforts to refresh and improve the

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[22] *See* Order & NPRM, ¶ 39.

[23] *See* 47 C.F.R. § 25.102(b) ("[p]rotection from impermissible levels of interference *to the reception of signals by earth stations* in the Fixed–Satellite Service from terrestrial stations in a co-equally shared band is provided through the authorizations granted under this part [emphasis added.]").

[24] *See* Comments of Broadband Access Coalition at 16, n.48, GN Docket No. 18-122 (filed Oct. 29, 2018) (noting that earth stations licensed to the Associated Press use only 23 MHz of spectrum for each earth station, according to its website); *see also* Petition for Rulemaking of Broadband Access Coalition at 22, n.42, CG Docket No. RM-11791 (filed June 21, 2017).

fidelity of the C-Band registration database,[25] another registrant submitted approximately 3,000 registration applications claiming full-band, full-arc use, even though technical data on their own website shows that they use only a single frequency on one C-Band satellite.[26] This represents an enormous consumption of spectrum for no communications purpose whatsoever.

Indeed, the Commission's rules already reflect that earth station operators have only limited protection for particular frequencies and recognize that registrants may not use less of the band than they claim in their registration. The rules state that registration will be automatically terminated if actual use is inconsistent with the registration or if the facility is used less than 50% of the time.[27] Therefore, reserving full-band, full-arc registration for the few, if any, instances in which it is justified by immediate need is consistent with the existing rules' insistence that earth station operators are protected only for actual use and would simply make this existing policy more administrable. Taking this step now is important for the same reasons Commissioner O'Rielly has recognized in discussing the 6 GHz band: "We no longer have the luxury of over-

[25] *Temporary Freeze on Applications for New or Modified Fixed Satellite Service Earth Stations and Fixed Microwave Stations in the 3.7-4.2 GHz Band*, Public Notice, DA No. 18-398, GN Docket No. 17-183 (rel. Apr. 19, 2018).

[26] *See* "Worldwide Satellite Carriers," The Church of Jesus Christ of Latter-Day Saints (last updated June 26, 2019), https://www.churchofjesuschrist.org/help/support/satellite-carriers?lang=eng#5.

[27] 47 C.F.R. § 25.162(c), (e) (providing that "protection from interference afforded by the registration of a receiving earth station shall be automatically terminated if . . . [t]he Commission finds that the station has been used less than 50% of the time during any 12 month period [or] . . . [t]he Commission finds that the actual use of the facility is inconsistent with what was set forth in the registrant's application.").

protecting incumbents via technical rules, enormous guard bands, or super-sized protection zones. Every megahertz must be used as efficiently as possible."[28]

The full-band, full-arc licensing practice in the C-Band dates back to the early days of satellite communications, when it was accepted by the Commission in the context of a dispute over international frequency coordination.[29] The Commission stated that the full-band, full-arc frequency coordination procedure requested by an applicant was "consistent with the practice followed within the United States *which has had little or no adverse effect upon terrestrial systems in the areas concerned*."[30] Five decades later, the full-band, full-arc coordination practice continues, even though it now has substantial adverse effects on the ability of FS systems (both point-to-point and potential P2MP) to coordinate with earth stations. Further, full-band, full-arc protection is less justified even from the perspective of the satellite industry, because advances in satellite technology now allow satellite operators to use spectrum more efficiently.[31] Indeed, the C-Band Alliance relies on such advances to explain how its members can accommodate current satellite uses even with a 200 megahertz reduction in their

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[28] Michael O'Rielly, Commissioner, FCC, *Remarks of FCC Commissioner Michael O'Rielly Before the Wi-Fi Alliance Annual Member Meeting* (June 4, 2019), https://docs.fcc.gov/public/attachments/DOC-357794A1.pdf.

[29] *See* Petition for Rulemaking of Fixed Wireless Communications Coalition at 6-7, CG Docket No. RM-11778 (filed Oct. 11, 2016); *Joint Application of Commc'ns Satellite Corp. et al*, 8 F.C.C.2d 1001, ¶ 7 (1967).

[30] *Joint Application of Commc'ns Satellite Corp. et al*, 8 F.C.C.2d at ¶ 7 (emphasis added).

[31] *See, e.g.,* Ajit Pai, Chairman, FCC, *Remarks of FCC Chairman Ajit Pai at the Satellite Indus. Assoc.'s 21st Annual Leadership Dinner, Washington, DC*, 3 (Mar. 12, 2018), https://docs.fcc.gov/public/attachments/DOC-349676A1.pdf ("[I]n the past six decades, we've witnessed amazing advances in satellite technology.").

available spectrum.[32] Full-band, full-arc coordination represents an artifact of early satellite operations and is inconsistent with the efficiency goals of modern spectrum management and the Commission's strategic goals of promoting innovation.[33] Eliminating the practice would be consistent with Chairman Pai's commitment to removing "regulatory underbrush" that holds back investment and new technologies.[34]

Just as the Commission has legal authority to discontinue the practice of allowing full-band, full-arc registration for future registrations, it can require existing earth stations to amend their registrations to come into compliance with their actual use of the band. Section 316 of the Communications Act allows the Commission to modify station licenses, so long as the license or permit holder has notice and opportunity to respond to the proposed modification.[35] In *Community Television*, the D.C. Circuit explained that,

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[32] Comments of C-Band Alliance at 24-25, GN Docket No. 18-122 (filed Oct. 29, 2018) (noting that the satellite operators can determine how the state of technology can fulfill current and future needs in a limited frequency range); Reply Comments of C-Band Alliance at 15, GN Docket No. 18-122 (filed Dec. 11, 2018) (noting that discussion with its members of "advanced filter technologies" resulted in a conclusion that it could clear 200 MHz of spectrum).

[33] *See, e.g.,* 47 U.S.C. § 303(f), (g) (providing that as the "public convenience, interest, or necessity requires," the Commission shall make regulations to "generally encourage the larger and more effective use of radio in the public interest."); *see also* Federal Communications Commission, *Strategic Plan 2018-2022*, 8 (Feb. 12, 2018), https://docs.fcc.gov/public/attachments/DOC-349143A1.pdf (explaining that the Commission seeks to foster an "innovative market for communications services through policies that promote the introduction of new technologies and services" by "removing barriers to innovation and investment" and "eliminating unnecessary administrative burdens.").

[34] *See* Ajit Pai, Chairman, FCC, *Remarks of FCC Commissioner Ajit Pai before the Free State Foundation's Tenth Anniversary Gala Luncheon, Washington, DC*, 2 (Dec. 7, 2016), https://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db1207/DOC-342497A1.pdf.

[35] *See* 47 U.S.C. § 316(a)(1) (providing that "[a]ny station license . . . may be modified by the Commission either for a limited time or for the duration of the term thereof, if in the judgment of the Commission such action will promote the public interest,

under its Section 316 authority, "the FCC may modify entire classes of licenses," and that the Commission acts within that authority where the "FCC has not wrought a fundamental change to the terms of those permits and licenses."[36] The court there reasoned in the context of the analog-to-digital broadcast transition that the Commission had permissibly modified broadcasters' existing licenses where the broadcasters would "begin and end the transition period broadcasting television programming to the public under very similar terms."[37] The court reached this conclusion even though the FCC chose not to require 100% simulcasting on the analog and digital channels throughout the transition.[38] Thus, where the Commission seeks to facilitate the more efficient use of spectrum in the public interest, it can act to modify existing licenses or registrations so long as it provides notice and the modification does not fundamentally change the ability of existing licensees or registrants to provide services.

Here, requiring earth station operators to conform previously submitted full-band, full-arc registrations to reflect actual use does not represent a fundamental change to the terms of satellite licenses. In fact, it effectuates earth station operators' existing responsibility to comply with 47 C.F.R. § 25.162(c) and (e). Satellite operators will continue to receive interference protection through earth station-FS coordination for the frequencies and angles they actively use. Not only will satellite operations be protected

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convenience, and necessity . . . No such order of modification shall become final until the holder of the license or permit shall have been notified in writing of the proposed action and the grounds and reasons therefor, and shall be given reasonable opportunity, of at least thirty days, to protest such proposed order of modification.").

[36] *Cmty. Television, Inc. v. FCC*, 216 F.3d 1133, 1140-41 (D.C. Cir. 2000).

[37] *Id*. at 1141.

[38] *Id.*

for current use, but they will have future flexibility as well. In particular, new P2MP operations could accommodate future changes in frequencies, angles, or satellite signals received by earth stations and updated in the IBFS database.[39] Satellite operators will continue to be able to transmit the same signals to earth stations and provide the same services to customers after full-band, full-arc registration is limited to any instances of actual necessity.

Finally, eliminating the overbroad full-band, full-arc practice will also allow the Commission to more efficiently conduct any repacking process associated with implementing new, flexible use terrestrial licenses in the C-Band. AT&T explains that the protection thresholds for new 5G deployments proposed by the C-Band Alliance aggressively assume full-band, full-arc protection for *all* registered earth stations.[40] However, as AT&T observes, "a smarter FSS repacking strategy could significantly reduce the number of theoretical earth station[] pointing options that 5G operators would need to protect while still ensuring full protection of all current C-band *use*, thus significantly improving spectral efficiency use of the band."[41]

IV. CONCLUSION

Space station operators have Commission authorizations to transmit and successfully connect to earth stations registered in accordance with FCC rules. The Commission can reorganize the band consistent with those rights by ensuring that, after

[39] Reply Comments of Google LLC at 5, GN Docket No. 18-122 (filed Dec. 11, 2018) (noting that P2MP equipment could be operable across the C-Band so that fixed operators could accommodate changes to the locations or frequencies in earth station registrations).

[40] Letter from Henry G. Hultquist, Vice President, Federal Regulatory, AT&T, to Marlene Dortch, Secretary, FCC at 3, 5, GN Docket No. 18-122 (filed May 23, 2019).

[41] *Id.* at 13.

portions of the C-Band are repurposed for flexible terrestrial use, the remaining satellite operations are protected where protection is actually necessary. Specifically, the Commission can authorize fixed P2MP services on a shared basis with FSS under the Part 101 rules, and can eliminate wasteful full-band, full-arc registrations for FSS in order to create greater opportunities for broadband through P2MP operations, especially in rural America. Doing so would not compromise any licensee's or registrant's protected rights because earth stations would still be safeguarded from harmful interference for all frequencies and orbital slots in which they actually receive space station signals. Likewise, space station operators will be able to exercise their rights to transmit and successfully connect to authorized earth stations.

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